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ABSTRACT

This document presents Nevada's standards for K-12 technology education. The first section provides guidelines for grades K-3, 4-5, 6-8, and 9-12 for the following content standards: (1) students will utilize problem-solving processes through the use of resources to reach a desired outcome; (2) students use appropriate productivity tools including, but not limited to, word processing, spreadsheet, database, multimedia, and telecommunications; (3) students use various technology tools to research information and evaluate its accuracy and appropriateness in order to solve problems and make decisions; (4) students will identify, apply concepts, and manage various tools and resources to evaluate their accuracy and appropriateness in solving problems and making decisions; (5) students will recognize that systems are made up of individual components and that each component affects the operation of the system and its relationship with other systems; and (6) students will evaluate the impact and ethical implications on individuals, society, and the environment. The second part lists performance level descriptors at each grade level for these content standards. A glossary is included. (MES)

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Nevada Computer and Technology Education Standards

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Academic Standards

Introduction

Practice High School Proficiency Tests

Arts

Computer & Technology

English Language Arts

Foreign Language

Health

Math

Physical Education

Science

Social Studies

Introduction

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The Nevada legislature passed major education reform legislation during its 1997 and 1999 sessions. A major emphasis of this legislation was to create standards to help improve the academic achievement of Nevada's students.

To accomplish this goal the Nevada Council to Establish Academic Standards for Public Schools was established. This Council was charged with establishing high, measurable standards in English language arts, mathematics, and science. They are similarly charged with establishing standards in social studies, computer and technology education, health and physical education, and the arts no later than January 15, 2000.

The members of this Council have devoted countless hours in order to provide the best possible framework for Nevada's children. They are Council Chair Ms. Debbie Smith, Assemblywoman Vonne Chowning, Mr. Scott Craigie, Senator Ann O'Connell, Dr. Benjamin Hart, Mr. Kirk Kelly Adams, Ms. Evelyn Allred and Ms. Elaine Wynn.

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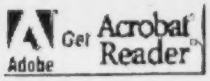

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Nevada Computer and Technology Education Standards

Introduction

The Nevada Legislature has recognized the importance of computer and technology education in SB 466, Section 8. NAC 389.688 requires a minimum of a one semester (1/2 credit) computer course for graduation.

Technology is the application of resources and knowledge to solve problems and meet human needs. Technology includes, but is not limited to, the use of computers. Society needs people adept at using technology. Advances in technology affect all of earth's living and nonliving systems. It is vital that students understand the interrelationships of technology, the environment and human activity. We should incorporate technology as students develop critical thinking skills and strategies in their classrooms. Understanding that students learn in different ways, we can help them use technology as a means to apply academics within a real-world context. Society needs individuals who are literate in technology and possess the skills that enable them to participate in a high-performance work force that adapts readily to constantly changing technology.

In order for teachers to implement and integrate the following standards, they must have adequate staff development.

Curriculum Integration

Computer and technology education is to be integrated within all grade level content standards. All teachers share this responsibility for student success.

Elementary School

Early learning experiences build the foundations for later learning. Integrating computer skills and technology concepts provides tremendous opportunity for students to apply knowledge through the design and use of materials and processes, to systematically solve real problems, and to gain new knowledge. Critical thinking, teamwork, research and development, experimentation, and testing help deliver the goals of the elementary curriculum and enrich the entire learning and teaching process.

Middle School

Technological learning and computer skill acquisition, with an emphasis on applied problem solving, continues the pathway between elementary and high school. The integration of computer and technology skills will provide an opportunity to apply theoretical concepts in real-world applications throughout the curriculum. Hands-on activities reinforce and extend student understanding and retention. Teachers emphasize the role technology plays in our day-to-day lives and the impact it has on individuals, societies and the environment. Technology enhances project-based learning and is designed to facilitate individual interests and learning styles. Experts continue to emphasize the need for technologically literate individuals. Exposure to the various areas of technology leads to informed career choices.

High School

Students must develop an understanding of the nature of technology, technological systems and applications, design and ingenuity, and the impact of various technologies. Course offerings must include elements to ensure students will comprehend and apply the computer and technology skills necessary to solve real-world problems. More in-depth courses will be offered to those students interested in pursuing a variety of career opportunities.

Problem-Solving

Content Standard 1.0: *Students will utilize problem-solving processes through the use of resources to reach a desired outcome.*

By the end of **Grade 3** students know and are able to:	By the end of **Grade 5** students know and are able to do everything required in previous grades and:	By the end of **Grade 8** students know and are able to do everything required in previous grades and:	By the end of **Grade 12** students know and are able to do everything required in previous grades and:	
		1.8.1 Differentiate design/problem-solving methods and components of technology using accurate terminology.	1.12.1 Analyze a variety of problem-solving approaches, which can be used and combined in seeking solutions.	**Knowledge**
		1.8.2 Select and evaluate appropriate designs requiring **optimization** and making **trade-offs**.	1.12.2 Develop and implement a design/problem-solving method based on a need or want.	**Processes**
		1.8.3 Select and apply a design/problem-solving method to reach a desired outcome.		**Application**

Optimization- The process of making an alternative work as well as it can. (Hacker)
Trade-offs - An exchange of one thing in return for another to achieve a desired result.

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Productivity Tools

Content Standard 2.0: *Students use appropriate productivity tools including, but not limited to, word processing, spreadsheet, database, multimedia and telecommunications.*

By the end of **Grade 3** students know and are able to do:	By the end of **Grade 5** students know and are able to do everything required in previous grades and:	By the end of **Grade 8** students know and are able to do everything required in previous grades and:	By the end of **Grade 12** students know and are able to do everything required in previous grades and:	
2.3.1 Locate and use letters, numbers, and special keys on a keyboard using the left or right hand.	2.5.1 Apply correct finger placement for basic keyboarding skills.	2.8.1 Demonstrate proficiency and accuracy in keyboarding skills.	2.12.1 Demonstrate advanced proficiency and accuracy in keyboarding skills.	**Keyboarding**
2.3.2 Create a document that demonstrates simple typing and editing skills.	2.5.2 Create a document including a graphic using basic formatting techniques that demonstrate the ability to type, edit, and print.	2.8.2 Create a document using advanced formatting techniques that demonstrate the ability to import a graphic, type, edit, and print.	2.12.2 Create a multi-page document in conjunction with other tools that demonstrate the ability to type, format, edit, and print.	**Word Processing**
2.3.3 Search a database to locate specific information (e.g. electronic sources, telephone book, encyclopedia, and library card catalog).	2.5.3 Create a database with predefined fields, enter data for multiple records, and print reports based on sort query using ascending and descending order.	2.8.3 Create a database, define fields, enter data for multiple records, and print reports based on sort and query.	2.12.3 Create a database, define fields, enter data for multiple records, and print reports based on sort and query. Interpret report based on data.	**Database**
2.3.4 Utilizing a pre-designed spreadsheet, demonstrate the ability to enter simple labels, values, and formulas.	2.5.4 Construct a guided spreadsheet containing appropriate labels, values, formulas, and simple functions.	2.8.4 Generate a spreadsheet including labels, values, formulas, and functions; create a chart to visually represent data. Print a spreadsheet showing formulas.	2.12.4 Generate a spreadsheet including labels, values, formulas, and functions; create a chart to visually represent data. Analyze the significance of the data. Print a spreadsheet showing formulas.	**Spreadsheet**

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By the end of **Grade 3** students know and are able to do:	By the end of **Grade 5** students know and are able to do everything required in previous grades and:	By the end of **Grade 8** students know and are able to do everything required in previous grades and:	By the end of **Grade 12** students know and are able to do everything required in previous grades and:	
2.3.5 Explain the purpose of a multimedia presentation using **multimedia** software.	2.5.5 Create a multimedia document or presentation using text, graphics, and/or sound.	2.8.5 Create a multi-page multimedia presentation using text, graphics, and sound to effectively communicate a concept.	2.12.5 Create and present a multi-page, multimedia presentation incorporating three or more of the following: text, graphics, sound, animation, digital video or linking. Analyze and critique a multimedia presentation.	**Multimedia**
2.3.6 Create and save files on various storage media.	2.5.6 Explain the differences between **data files**, **program files**, and describe and use the **file management** software of a computer.	2.8.6 Organize files on a computer disk, drive, server, or other storage device.		**File Management**
2.3.7.1 Identify **electronic communication** devices. 2.3.7.2 Identify devices that require connectivity.	2.5.7.1 Describe the process of accessing a LAN and demonstrate the process as available. 2.5.7.2 Define and explain the uses of an electronic communication device, **telecommuting,** and **teleconferencing**.	2.8.7.1 Explain the advantages of connectivity with various systems to share information and resources. 2.8.7.2 Employ the use of electronic communication.	2.12.7 Locate and evaluate sources of distance learning, telecommuting and teleconferencing and analyze the uses these electronic communications.	**Connectivity, Electronic Devices, and Distance Learning,**

Multimedia- The use of more than one media, such as any combination of sound, graphics, animation and video. A "multimedia" computer typically has speakers for sound and a fast microprocessor that can handle graphics, animation and video. A multimedia software application usually contains images, audio, text and, in many cases, video clips and animations.

Utility- A program used to solve a specific problem or fill a particular system management need. For instance, a backup utility is a program that helps you back up your computer's hard drive.

Electronic communication- Any content used to convey a message that has been transmitted via electronic means such as e-mail, video conferencing, etc.

Telecommuting- Telecommuting is a term used to indicate the process of working outside of the office by a modem hookup to the main office system.

Teleconferencing- A telephone communication in which more than two people are simultaneously connected so they can exchange verbal comments as if they were in the same room having a face-to-face conference. A teleconference need not have visual communications in addition to audio communications, but modern technology now makes it possible to see conference members on monitor screens or television screens.

File management-Provides functions to delete, copy, move, rename, view files, and manage directories or folders.

Networking Systems – LAN, WAN, Intranet, Internet

Data files- A data file. Whatever you create with an application, including information you type, edit, view, or save. A document may be a business report, a picture, or a letter and is stored as a file on a disk.

Program files- On a PC, an executable file that starts an application or program. A program file has an .EXE, .PIF, .COM, or .BAT filename extension.

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Research Tools

Content Standard 3.0: *Students use various technology tools to research information and evaluate its accuracy and appropriateness in order to solve problems and make decisions.*

By the end of **Grade 3** students know and are able to do:	By the end of **Grade 5** students know and are able to do everything required in previous grades and:	By the end of **Grade 8** students know and are able to do everything required in previous grades and:	By the end of **Grade 12** students know and are able to do everything required in previous grades and:	
3.3.1 Select a research topic or define a problem using technology tools.	3.5.1 Select a research topic or define a problem and predict outcomes using technology tools.	3.8.1 Select a research topic or a statement of a problem identifying its elements, its scope, and the expected outcomes using technology tools.	3.12.1 Independently identify a research topic or state a problem that clearly identifies its elements, its scope, and the expected outcomes using technology tools.	**Define a Problem**
	3.5.2 Generate keywords for a research topic or problem.	3.8.2 Generate a list of keywords for a research topic or problem and conduct a search of electronic-based sources.	3.12.2 Generate a list of keywords for a research topic or problem with **qualifying modifiers** and conduct a search of electronic-based sources.	**Keywords and Sources**
3.3.3 Select information for a research topic or problem from a remote resource.	3.5.3 Select information from a variety of remote resources for a research topic or problem exploring **hyperlinks**.	3.8.3 Select and evaluate information from a variety of remote resources for a research topic or problem exploring hyperlinks.	3.12.3 Utilizing different search strategies, conduct research using hyperlinks to select information for a specific topic or problem.	**Information Links**

Qualifying modifiers- Words or symbols used to define or limit the results of a search.

Hyperlinks- A section of text or graphic that when clicked, will take you to another area of a service or Web Page. Most Internet Service Providers support hyperlinks in browsers, Instant Messages and E-Mail. They are quite helpful for those not experienced in addresses to route to where they need to be. These are often called just links for short. Links can carry you to a different site, other text on the same site or a specific area of a specific site, directly to specific target of text or graphics.

Remote resource- Resources not located on the user's machine. The resources may be located on another machine/server at the same location or the resources may be located on the Internet.

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By the end of **Grade 3** students know and are able to do:	By the end of **Grade 5** students know and are able to do everything required in previous grades and:	By the end of **Grade 8** students know and are able to do everything required in previous grades and:	By the end of **Grade 12** students know and are able to do everything required in previous grades and:	
3.3.4 Identify and examine **organizational formats** using a technology tool to arrange information.	3.5.4 Use an organizational format to arrange information for presentation or decision-making.	3.8.4 Use an organizational format to arrange information for presentation or decision-making.	3.12.4 Organize information logically for presentation or decision-making.	**Organization**
	3.5.5 Demonstrate an understanding of intellectual property and identify source and content of information collected.	3.8.5 Check collected information for reliability, authenticity, and timeliness, citing sources of copyrighted materials in papers, projects, and multi-media presentations.	3.12.5 Compare and contrast collected information to validate its reliability, authenticity, and timeliness.	**Evaluation**
	3.5.6 Generate a list of sources.	3.8.6 Generate a bibliography.	3.12.6 Demonstrate the ability to document all sources using an accepted standard citation format.	**Citation**
	3.5.7 Summarize and share the research process and its outcome.		3.12.7 Given a rubric, evaluate the research process and its outcome.	**Evaluation of Results**

Organizational formats-Outlines, Venn diagrams, web mapping, flow charts or any other schematic used to organize information.
Venn diagrams-A pictorial representation using circles and squares so positioned as to represent an operation in set theory. A graph that employs circles to represent logical relations by the inclusion, exclusion, or intersection of the circles.

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Tools and Processes

Content Standard 4.0: *Students will identify, apply concepts, and manage various tools and resources to evaluate their accuracy and appropriateness in solving problems and making decisions.*

By the end of **Grade 3** students know and are able to:	By the end of **Grade 5** students know and are able to do everything required in previous grades and:	By the end of **Grade 8** students know and are able to do everything required in previous grades and:	By the end of **Grade 12** students know and are able to do everything required in previous grades and:	
4.3.1 Identify the appropriateness and uses of resources and tools in **technology** based activities.	4.5.1 Recognize that technological **resources** include people, information, materials, machines, energy, capital, and time.	4.8.1 Explain how technology skills and tools enhance productivity in creating projects, building prototypes and modeling. (e.g., measuring, shaping, forming and fastening materials)	4.12.1 Analyze how the development of new tools, materials, and processes is necessary to maintain and improve high productivity and quality.	**Knowledge**
4.3.2 Select and use applicable tools for tasks.	4.5.2 Employ tools and materials to design or develop products or projects.	4.8.2 Use tools, instrumentation, equipment, materials, and processes to make designs, simulations, and **prototypes**.	4.12.2 Use tools to design and/or create solutions that are functional, aesthetically pleasing, demonstrate quality, and have value greater than the investment of time, energy, effort, and other resources.	**Process**

Technology- Human innovation in action. It involves the generation of knowledge and processes to develop systems that solve problems and extend human capabilities. (ITEA) The use of accumulated knowledge to process resources to satisfy human needs and wants. (Hacker)
Resources- The things needed to get a job done. In a technical system the seven types of resources are people, information, materials, tools and machines, energy, capital, and time.
Prototype- A working model of a new product, intended to test its operation. (Wright)

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4.3.3 Recognize the importance of safety in computer and technology applications.	4.5.3 Demonstrate the importance of safety and ease of use in selecting appropriate tools.	4.8.3 Compare and contrast the safe use of technology tools, hand and power tools, processes, and materials in diverse computer and technology applications.	4.12.3 Evaluate the available tools and select the appropriate tool and process that would safely accomplish the task.	**Safety**
4.3.4 With teacher guidance, resolve difficulties using tools or **devices** including **input devices**, **output devices**, and devices requiring **connectivity** to successfully perform basic computer operations.	4.5.4 Solve difficulties with tools or devices to accomplish the desired result including computer operations and recognize basic operational problems, such as printer jams, and possible solutions.	4.8.4 Demonstrate an understanding of the operation and maintenance of technology tools such as hand tools, power tools, lasers, hydraulics, pneumatics, electronics, hardware, software, **CNC** machines, computers, robotics, and fiber optics.	4.12.4 Evaluate and then correct non-functioning technology system/subsystem areas needed to accomplish required tasks.	**Trouble-shooting**

Devices- Things used or constructed for particular purposes such as machines to perform one or more relatively simple tasks. (American Heritage Dictionary)
Input Devices- Peripheral devices that enter data into the computer, such as a keyboard, scanner, mouse, or digitizer tablet.
Output Devices-Any peripherals that transfer or transmit data from the computer, such as screen, printer, or communications line.
CNC Machines-Computer numerical control (machines that might be used to control another machine such as a robotic arm)

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Systems

Content Standard 5.0: *Students will recognize that systems are made up of individual components and that each component affects the operation of the system and its relationship with other systems.*

By the end of **Grade 3** students know and are able to:	By the end of **Grade 5** students know and are able to do everything required in previous grades and:	By the end of **Grade 8** students know and are able to do everything required in previous grades and:	By the end of **Grade 12** students know and are able to do everything required in previous grades and:	
5.3.1 Define a *system*.	5.5.1 Explain open, closed, simple, complex, micro and macro systems.	5.8.1 Interpret resources that are essential and those that must be used effectively to produce a desired outcome, and **output** from one system may be **input** to another system.	5.12.1 Interpret the ways technological systems have evolved and will continue to evolve to satisfy human needs and desires.	**Knowledge**
5.3.2 Identify the parts of a system and explain how the parts working together allow the system to do things the individual parts are unable to do alone (e.g., components of a computer system).	5.5.2 Explain how systems depend on a variety of resources to produce a desirable outcome (e.g., computer information processing cycle).	5.8.2 Differentiate among various systems, explain capabilities and limitations, and identify the ways in which they are controlled to produce a desired outcome (e.g., limitations of the components of a computer system).	5.12.2 Demonstrate how systems are planned, organized, designed, built, and controlled.	**Process**
5.3.3 Identify and categorize systems that provide food, clothing, shelter, entertainment, communications, health care, security, and other necessities and comforts of life.	5.5.3 Classify systems according to type and level. (e.g., **open loop system** or **closed loop system**, simple or complex, and micro or macro)	5.8.3 Use a system to achieve a desired outcome in the areas of construction, communication, manufacturing, energy, power, transportation, and biotechnology.	5.12.3 Evaluate systems **model(s)** including the stages of input, processes, output, **feedback**, and consequences.	**Application**

Output- The results, good and bad, of the operation of any system. (Wright)
Input- Something put into a system or expended in its operation to achieve a result or output. (American Heritage Dictionary)
Open loop system- A system that does not use information about the output to affect the process.
Closed loop system- A system that uses feedback to affect the process.
Model- The testing of a problem solution or a system itself. (Hacker)
Feedback- The return of information about the result of a process. (American Heritage Dictionary)

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Implications on Society

Content Standard 6.0: Students will evaluate the impact and ethical implications on individuals, society and the environment.

By the end of **Grade 3** students know and are able to:	By the end of **Grade 5** students know and are able to do everything required in previous grades and:	By the end of **Grade 8** students know and are able to do everything required in previous grades and:	By the end of **Grade 12** students know and are able to do everything required in previous grades and:	
6.3.1 Describe how technology is used in daily activities to meet personal needs. Describe computer piracy and the personal consequences of inappropriate use.	6.5.1 Examine **products** and communicate how that product solved a human need or want.	6.8.1 Practice legal and ethical behaviors when using information and technology. Discuss the consequences of misuse on society and the environment.	6.12.1 Analyze the impact of new and improved products and services on the quality of life.	**Knowledge and Ethics**
6.3.2 Practice etiquette using technology. Describe changes in the local community because of technology.	6.5.2 Explain how physical environments are changed by technological developments.	6.8.2 Evaluate the effect technology has on society and the environment.	6.12.2 Analyze how the effects of a given technology may be unacceptable under a certain set of circumstances, but acceptable under another set of circumstances.	**Application and Electronic Communication**
	6.5.3 Describe the relationship between careers and technological developments.	6.8.3 Examine the role of technology in the workplace and explore careers that use technology.	6.12.3 Research and select a career choice, develop a career plan, and select the courses/program for **entry-level skills.** (e.g. Career Information System)	**Careers**

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6.3.4 Describe common uses of technology in daily life and how environments are changed.	6.5.4 Explain society's use of technology and describe both the positive and negative impacts on the workplace, society, and the environment.	6.8.4 Explain how people can control the technologies they develop and use, and why people are responsible for the effects these have on society, the environment and careers.	6.12.4 Analyze significant events, inventions, and discoveries in the history of technology and their affects on beliefs, attitudes and behavior in business, society, or culture.	**Societal Impacts**

Products- Objects, structures, or environments, produced by human or mechanical effort. (Todd)
Entry-level skills- Basic skills required entering a given occupation.

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Performance Level Descriptors

Computer and Technology Education Standards

Performance Level Descriptors
Computer and Technology Education Standards
Grade 3

Content Standard 2.0	**Productivity Tools:** Students use appropriate productivity tools including but not limited to word processing, spreadsheet, database, multimedia and telecommunications.
Exceeds Standard	• Locate and use letters, numbers, and special keys on a keyboard using the correct finger placement with speed and accuracy. • Compose and edit a word-processing document. • Independently searches a database for information. • Modify formulas in a pre-designed spreadsheet. (Fields and formulas are already entered into the database and spreadsheet.) • Create a multimedia document using text, graphics and sound. • Organize, create, and save files on various storage media. • Identify and use devices that require connectivity. • Explain the uses of electronic communication devices. • Explain the differences between a network and a stand-alone computer system.
Meets Standard	• Locate and use letters, numbers, and special keys on a keyboard using the left and right hand as appropriate. • Type and edit an existing document. • Search a database to locate specific information. • Utilize a pre-designed spreadsheet to enter simple labels, values and formulas. Grade appropriate formulas would be three cell (e.g.2+2=4). • Use multimedia software. • Explain the purpose of a multimedia presentation. • Create and save files on various storage media. • Identify the differences between a network and a stand-alone computer system. • Identify a variety of electronic communication devices.
Approaches Standard	• Occasionally locate and use letters, numbers, and special keys on a keyboard using the left or right hand as appropriate. • Attempts to type and edit an existing document. • Requires assistance to search a database to locate specific information. • Requires assistance to enter data into a spreadsheet. • Demonstrates limited knowledge of multimedia or of a multimedia presentation. • Has difficulty identifying devices that require connectivity. • Create and save files on various storage media with direction. • Shows limited knowledge of the differences between a network and a stand-alone computer system. • Unable to identify more than one electronic communication device.
Below Standard	• Infrequently able to locate letters, numbers, and special keys on the keyboard using the right or left hand as appropriate. • Unable to type and edit an existing document. • Unable to search a database to locate specific information. • Unable to utilize a pre-designed spreadsheet. • Shows little or no knowledge of multimedia.or of a multimedia presentation. • Cannot identify devices that require connectivity.

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	• Unable to create and save files on storage media. • Unable to identify the differences between a network and a stand-alone computer system. • Unable to identify any electronic communication devices.

Performance Level Descriptors
Computer and Technology Education Standards

Grade 3

Content Standard 3.0	**Research Tools:** Students use various technology tools to research information and evaluate its accuracy and appropriateness in order to solve problems and make decisions.
Exceeds Standard	• Contributes multiple ideas for topic or definition of problem. • Generates ideas to lead group selection of research materials. • Can identify an organizational tool and can independently place information within the format.
Meets Standard	• Contributes an idea for topic or definition of problem. • Works within a group to successfully select research materials. • Can identify an organizational tool and place information within the format.
Approaches Standard	• Participates but ideas are not applicable and is unable to select a topic or define a problem. • Works within a group but makes minimal contribution to collect research materials. • Recognizes an informational tool, but misplaces some information.
Below Standard	• Does not participate with the group and cannot select a topic or define a problem. • Distracts group work. Unable to contribute to task. • Does not recognize organizational tools and cannot place information within a format.

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Performance Level Descriptors
Computer and Technology Education Standards

Grade 3

Content Standard 4.0	**Tools and Processes:** Students will identify, apply concepts, and manage various tools and resources to evaluate their accuracy and appropriateness in solving problems and making decisions.
Exceeds Standards	• Demonstrates the tools and resources as used in computers and technology. • Always selects and manipulates tools for tasks in computer and technology areas. • Models the importance of safety while in computers and technology. • Independently resolves difficulties using tools or devices.
Meets Standards	• Identifies tools and resources as used in computers and technology. • Regularly selects and manipulates tools for tasks in computer and technology areas. • Demonstrates the importance of safety while in computers and technology. • With guided practice, regularly resolves difficulties using tools or devices.
Approaches Standards	• Seldom identifies the tools and resources as used in computers and technology. • Seldom selects and manipulates tools for tasks in computer and technology areas. • Seldom demonstrates the importance of safety while in computer and technology areas. • With guided practice, seldom resolves difficulties using tools or devices.
Below Standard	• Fails to identify the tools and resources as used in computers and technology. • Fails to select and manipulates tools for tasks in computer and technology areas. • Fails to demonstrate the importance of safety while in computer and technology areas. • With guided practice, fails to resolve difficulties using tools or devices.

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Performance Level Descriptors
Computer and Technology Education Standards

Grade 3

Content Standard 5.0	**Systems:** Students will recognize that systems are made up of individual components and that each component affects the operation of the system and its relationship with other systems.
Exceeds Standards	• Distinguish between an open and closed loop system. • Create a model to demonstrate how the parts of a system work together to achieve the desired outcome. • Model the relationships among technological systems. (i.e. construction, communications, energy, power, transportation, biotechnology, and manufacturing)
Meets Standards	• List the parts of an open and closed loop system. • Given a system, explain how the parts of a system work together to achieve the desired outcome. • List and group technological systems. (i.e. construction, communications, energy, power, transportation, biotechnology, and manufacturing)
Approaches Standards	• Recognizes that there are systems. • Recognizes some parts of a system but is unable to explain how they work together. • With assistance, list and group technological systems. (i.e. construction, communications, energy, power, transportation, biotechnology, and manufacturing)
Below Standard	• Unable to recognize systems. • Does not recognize the parts of a system. • Unable to list and group technological systems. (i.e. construction, communications, energy, power, transportation, biotechnology, and manufacturing)

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Performance Level Descriptors
Computer and Technology Education Standards

Grade 3

Content Standard 6.0	Implications on Society: Students will evaluate the impact and ethical implication on individuals, society and the environment.
Exceeds Standards	• Differentiate the common uses of technology in daily life and explain some of the advantages and disadvantages they provide. • Describe changes around the school and the community as a result of technology. • Independently list several careers that exist today that were not in existence when the student was born. • Investigate how physical environments are changed by human activity through technology.
Meets Standards	• Discuss common uses of technology in daily life and the advantages and disadvantages those uses provide. • Explain computer piracy and its implications. • Uses proper etiquette when using electronic communications. • List changes around the school and in the community as a result of technology. • With teacher help, list several careers that exist today that were not in existence when the student was born. • Explains how physical environments are changed by human activity through technology
Approaches Standards	• Attempts to recognize and identify technological products that are used in daily life. • Tries to explain how physical environments are changed by human activity through technology. • With teacher help, has difficulty listing careers that exist today that were not in existence when the student was born.
Below Standard	• Unable to recognize and identify technological products that are used in daily life. • Fails to identify how physical environments are changed by human activity through technology. • With teacher help, cannot list careers that exist today that were not in existence when the student was born.

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Performance Level Descriptors
Computer and Technology Education Standards

Grade 5

Content Standard 2.0	**Productivity Tools:** Students use appropriate productivity tools including but not limited to word processing, spreadsheet, database, multimedia and telecommunications.
Exceeds Standard	• Demonstrate and use correct finger placement for basic keyboarding skills with sped and accuracy • Composes and edits a word processing document. • Includes multiple graphics in a word processing document. • Create a unique database. • Independently develops a useful spreadsheet. • Creates a multi-page, multimedia document or presentation including text, graphics and sound to organize and present an idea. • Effectively use the file management software of a computer to copy, move, rename and delete files. • Unable to identify a LAN. • Unable to explain the uses of electronic communication device. • Cannot distinguish between distance learning, telecommuting and teleconferencing. • Explain benefits of a LAN and a WAN. • Effectively use an electronic communication device. • Compare and contrast the uses of distance learning, telecommuting and teleconferencing.
Meets Standard	• Demonstrate and use correct finger placement for basic keyboarding skills. • Use basic formatting techniques such as font selection, size and color. • Use tools such as spell-check to edit a composed document. • Include a graphic in a document. • Print a document. • Create a database using predefined fields. (Fields and formulas are listed for entry in a database and spreadsheet.) • Enter data for multiple records. • Print reports based on sort and query. (A search for certain criteria in a specified field.) • Construct a guided spreadsheet. • Create a multimedia document or presentation using text, graphics and/or sound to organize and present an idea. • Describe and use the file management software of a computer. • Explain the differences between data files, program files, and operating system files. • Describe access privileges and demonstrate the process where possible. • Identifies a LAN. • Explain the uses of electronic communication device. • Define distance learning, telecommuting and teleconferencing.

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Performance Level Descriptors
Computer and Technology Education Standards

Grade 5 (Standard 2.0 continued)

Approaches Standard	• Demonstrate and use correct finger placement for basic keyboarding skills with limited accuracy. • Demonstrates limited word processing abilities. • Sporadically uses database. • Requires assistance to use a spreadsheet. • May require some assistance to include two out of the three required components for a multimedia project or presentation to organize and present an idea. • Has limited file management skills. • Explains the differences between data files and program files. • Has limited success with access privileges and demonstrating the process where possible. • Inconsistently identifies a LAN. • Limited ability to define the uses of electronic communication device. • Has limited knowledge of distance learning, telecommuting and teleconferencing.
Below Standard	• Unable to use correct finger placement for basic keyboarding skills. • Demonstrates little or no word processing abilities. • Unable to use a database. • Unable to use a spreadsheet. • Unable to create a multimedia project or presentation to organize and present an idea. • Unable to use file management software of a computer. • Unable to explain the differences between data files, program files, and operating files. • Unable to describe access privileges and cannot demonstrate the process • Unable to identify a LAN. • Unable to explain the uses of electronic communication device. • Cannot distinguish between distance learning, telecommuting and teleconferencing.

Performance Level Descriptors
Computer and Technology Education Standards

Grade 5

Content Standard 3.0	**Research Tools:** Students use various technology tools to research information and evaluate its accuracy and appropriateness in order to solve problems and make decisions.
Exceeds Standard	• With minimal assistance, individually select a research topic or define a problem giving a possible outcome and listing available technology-based tools to be used. • With minimal direction, generates a substantial list of keywords to conduct search(s). • With minimal direction, use hyperlinks to collect information useful to the research of a topic or problem. • Can identify an organizational tool and independently place information within the format and recognize that there may be more than one way to organize information. • Can evaluate and integrate sources and content of information selected from various electronic media. • Independently generates extensive list of sources used. • Independently summarize the research process and evaluate the outcome.
Meets Standard	• With teacher or media specialist direction, individually select a research topic or define a problem giving a possible outcome and listing available technology tools to be used. • With teacher or media specialist direction, generates a list of keywords to conduct an electronic search. • With teacher or media specialist help, explore hyperlinks to select and evaluate information useful to the research of a topic or problem. • Can help group identify an organizational tool and place information within the format. • Can demonstrate an understanding of intellectual property and identify source and content of information collected. • Collaboratively lists sources used. • With teacher or media specialist assistance summarize the research process and evaluate its outcome.

Performance Level Descriptors
Computer and Technology Education Standards

Grade 5 (Standard 3.0 continued)

Approaches Standard	• With extensive direction, individually select a research topic or define a problem giving a possible outcome and listing available technology-based tools to be used. • With extensive direction, generates a minimal list of keywords to conduct a search. • With extensive direction, explore the hyperlinks to collect information useful to the research or a topic or problem. • Works within a group, but makes minimal contributions in placing information within an organizational structure. • Some difficulty determining content and sources from electronic media. • Incomplete list of sources used. • With extensive assistance, summarize the research process and evaluate its outcome.
Below Standard	• Cannot individually select a research topic or define a problem giving a possible outcome and listing available technology-based tools to be used. • Generates ineffective keyword list resulting in unsuccessful search. • Unable to understand or use non-linear hyperlinks to find information. • Unable to organize information within a group. • Cannot incorporate sources and content while accessing electronic media. • Does not list sources. • Cannot summarize the research process or evaluate its outcome.

Performance Level Descriptors
Computer and Technology Education Standards

Grade 5

Content Standard 4.0	**Tools and Processes:** Students will identify, apply concepts, and manage various tools and resources to evaluate their accuracy and appropriateness in solving problems and making decisions.
Exceeds Standards	• Explains that technological resources include people, information, materials, machines, energy, effort, capital, and time. • Skillfully demonstrates the use of tools and materials to design/develop products/projects. • Models the safe use of tools. • Independently identify situations where incorrect, inoperable, or inappropriate tools are being used and take appropriate actions.
Meets Standards	• Lists the technological resources. (e.g., people, information, materials, machines, energy, effort, capital, and time) • Demonstrates the use of tools and materials to design/develop products/projects. • Selects and demonstrates the safe use of tools. • Identify situations where incorrect, inoperable, or inappropriate tools are being used and cooperatively take appropriate actions.
Approaches Standards	• Recognizes from a list the technological resources. (e.g., people, information, materials, machines, energy, effort, capital, and time) • Attempts to demonstrate some of the tools and materials used to design/develop products/projects. • Requires guidance while selecting and using tools safely. • Needs guidance to identify situations where incorrect, inoperable, or inappropriate tools are being used.
Below Standard	• Unable to list the technological resources. (e.g., people, information, materials, machines, energy, effort, capital, and time) • Does not demonstrate the use of tools and materials to design/develop products. • Fails to select and use tools safely. • Even with teacher supervision is unable to identify situations where incorrect, inoperable, or inappropriate tools are being used.

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Performance Level Descriptors
Computer and Technology Education Standards

Grade 5

Content Standard 5.0	**Systems:** Students will recognize that systems are made up of individual components and that each component affects the operation of the system and its relationship with other systems.
Exceeds Standards	• Distinguish among open, closed, simple, complex, micro and macro systems. • Independently identifies resources necessary to operate a system to achieve a desired outcome. • Create a model illustrating the type and level of a chosen system.
Meets Standards	• List the parts of open, closed, simple, complex, micro and macro systems. • Cooperatively identifies resources necessary to operate a system to achieve a desired outcome. • Given a multitude of systems sort according to type and level. (e.g. open / closed / macro / micro / simple / complex)
Approaches Standards	• With help can list the parts of open, closed, simple, complex, micro and macro systems. • Requires teacher assistance to identify resources necessary to operate a system to achieve a desired outcome. • Requires help to sort systems according to type and level.
Below Standard	• Unable to list the parts of open, closed, simple, complex, micro and macro systems. • Inaccurately identifies resources even with assistance. • Even with assistance is unable to sort systems according to type and level.

Performance Level Descriptors
Computer and Technology Education Standards

Grade 5

Content Standard 6.0	Implications on Society. **Students will evaluate the impact and ethical implication on individuals, society and the environment.**
Exceeds Standards	• Creates a project to meet a human need or want. • Evaluates the environmental outcomes of technology. • Research and create a presentation demonstrating how a career has evolved over time. • Explain changes in information technologies and the effect these changes have on the workplace and society.
Meets Standards	• Explain how a given object was developed to meet a human need or want. • Communicates the positive or negative environmental outcomes of technology. • Given a career compare and contrast the technological developments within that career. • Discusses changes in information technologies and the effect these changes have on the workplace and society.
Approaches Standards	• Has difficulty explaining how a given object was developed to meet a human need or want. • Confused about the environmental impacts of technology. • With teacher assistance can compare and contrast the technological developments within that career. • Has difficulty explaining changes in information technologies and the effect these changes have on the workplace and society.
Below Standard	• Unable to explain how a given object was developed to meet a human need or want. • Does not recognize environmental impacts of technology. • With teacher assistance unable to compare and contrast the technological developments within that career. • Unable to explain changes in information technologies and the effect these changes have on the workplace and society.

Performance Level Descriptors
Computer and Technology Education Standards

Grade 8

Content Standard 1.0	**Problem Solving:** ***Students will utilize problem-solving processes through the use of resources to reach a desired outcome.***
Exceeds Standards	• Analyze and model several design/problem-solving methods. • Evaluates and selects the optimal design/problem-solving method. • Creates and appropriately designs/models an innovative approach.
Meets Standards	• Describes more than one design/problem-solving method. • Selects an appropriate design/problem-solving method. • Generate a desired outcome using a problem-solving method.
Approaches Standards	• Describes a design/problem-solving method. • Attempts to select a design/problem-solving method. • With assistance attempts to achieve a desired outcome using a problem-solving method.
Below Standard	• Does not describe a design/problem-solving method. • Does not select a design/problem-solving method. • Does not reach the desired outcome.

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Performance Level Descriptors
Computer and Technology Education Standards

Grade 8

Content Standard 2.0	**Productivity Tools:** Students use appropriate productivity tools including but not limited to word processing, spreadsheet, database, multimedia and telecommunications.
Exceeds Standard	• Demonstrates proficiency and accuracy in keyboarding without visual reference. • Independently composes, edits, and formats a document using a word-processing program. • Creates a unique database that accurately interprets data. • Create several different charts from a spreadsheet to visually represent the same data. • Present a multi-page, multimedia presentation using text, graphics, sound and all of the following: animation, digital video and linking. (Creating a connection between two documents or sources.) • Move, copy, rename files on a computer disk, hard drive, server, or other storage device. • Explain knowledge of LAN connectivity through Ethernet, infrared, etc. • Strategically selects and uses the appropriate electronic communication. • Independently demonstrates knowledge by incorporating information retrieved from remote resources into different projects. • Demonstrates connectivity to share information and resources.
Meets Standard	• Demonstrates proficiency and accuracy in keyboarding skills. • Type, edit and print a document. • Use advanced formatting techniques such as margins, line spacing and tabs. • Import graphics with appropriate placement. • Search and Replace text. • Create a database, define fields and enter data for multiple records. • Print reports based on sort and query. • Develop a spreadsheet including labels, values, formulas and functions. • Create a chart that visually represents data. • Print a spreadsheet showing the formulas. • Create a multi-page, multimedia presentation using text, graphics and sound to effectively communicate a concept. • Organize files on a computer disk, hard drive, server, or other storage device. • Explain how a LAN, Intranet and Internet operates versus a stand-alone system. • Use an available electronic communication device (e-mail, fax, telephone, and two-way radios). • Explain the advantages of connectivity to share information and resources.

Performance Level Descriptors
Computer and Technology Education Standards

Grade 8 (Standard 2.0 continued)

Approaches Standard	• Demonstrates proficiency with limited accuracy in keyboarding skills. • Inconsistently applies word processing formats. • Inconsistently imports graphics in documents. • Demonstrates a narrow or incomplete understanding of a database. • Incorrectly applies spreadsheet functions. • Has difficulty incorporating all required multimedia components that effectively communicate a concept. • With assistance, can organize files on a computer disk, hard drive, server, or other storage device. • Attempts to explain how a LAN operates versus a stand-alone system. • Rarely chooses the correct electronic communication. • Ineffectively incorporates retrieved information into a document. • When directed, uses connectivity to share information and resources.
Below Standard	• Has limited proficiency and limited accuracy in keyboarding skills. • Incorrectly applies word processing techniques. • Unable to import graphics. • Unable to create or use a database. • Unable to create or use a spreadsheet. • Demonstrate little or no skill to integrate components into multimedia presentation to communicate a concept. • With detailed instructions, can organize files on a computer disk, hard drive, server, or other storage device. • Insufficiently explains how a LAN operates versus a stand-alone system. • Incapable of selecting the correct electronic communication. • Requires direct supervision to use connectivity to share information and resources.

Performance Level Descriptors
Computer and Technology Education Standards

Grade 8

Content Standard 3.0	**Research Tools:** Students use various technology tools to research information and evaluate its accuracy and appropriateness in order to solve problems and make decisions.
Exceeds Standard	• With minimal assistance select a research topic or develop a statement of a problem and identify its elements, scope, and expected outcomes. • Can generate a precise list of keywords to conduct a comprehensive search using electronic-based sources. • Successfully use hyperlinks to expand search parameters adding accurate details to information collected. • Can select an appropriate organizational tool and accurately place collected information within the format. • Differentiate between the various types of information and make refined selections of most reliable, authentic and timely sources. • Compose a standard bibliography.
Meets Standard	• With teacher and or media specialist assistance select a research topic or develop a statement of a problem and identify its elements, scope, and expected outcomes. • Independently generates a list of keywords to conduct a search using electronic-based sources. • Use hyperlinks to explore search possibilities when collecting information. • Can place information within an organizational format. • Demonstrates an understanding of intellectual property by citing sources of copyrighted materials in papers, projects and multimedia presentations. • Analyze selected information for reliability authenticity and timeliness. • In a group can contribute to generating a standard bibliography.
Approaches Standard	• With extensive assistance select a research topic or develop a statement of a problem and identify its elements, scope, and expected outcomes. • Can generate a minimal list of keywords to conduct a search using electronic-based sources. • Become distracted when exploring hyperlinks. They do not add to the collection of information. • Can identify an organizational tool, but needs assistance to place information within an organizational format. • Weak evaluation of collected information and choices are at times inappropriate. • In a group contribute to generating a standard bibliography with some errors.
Below Standard	• Unable to define a research topic or develop a statement of a problem. • Unable to develop an effective list of keywords to conduct a search. • Does not recognize hyperlink options/opportunities when presented. • Does not recognize organizational formats or their purpose. • All information seems of equal value. Unable to make good selections of information. • Does not contribute to the group when generating a standard bibliography.

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Performance Level Descriptors
Computer and Technology Education Standards

Grade 8

Content Standard 4.0	**Tools and Processes:** Students will identify, apply concepts, and manage various tools and resources to evaluate their accuracy and appropriateness in solving problems and making decisions.
Exceeds Standards	• Predict the tools and resources needed to solve a problem in a computer or technology area. • Skillfully models the proper use of tools, instrumentation, equipment, materials, and processes while fabricating models, designs, simulations and prototypes. • Independently compares and contrasts the safe use of tools, processes, and materials in diverse computer and technology applications. • Can assist others in the operation and maintenance of technology tools.
Meets Standards	• List the tools and resources needed to solve a problem in a computer and technology area. • Demonstrate the proper use of tools, instrumentation, equipment, materials, and processes while fabricating models, designs, simulations and prototypes. • Given a situation, can describe or define the correct use of tools, processes, and materials in diverse computers and technology applications. • Correctly operates and performs appropriate maintenance on technology tools.
Approaches Standards	• Recognizes some of the tools and resources needed to solve a problem in a computer and technology area. • Has difficulty properly using tools. • Collaboratively, when given a situation, can describe or define the correct use of tools, processes, and materials in diverse computer and technology applications. • With direct teacher supervision can correctly operate technology tools.
Below Standard	• Fails to recognize the tools and resources needed to solve a problem. • Fails to use tools properly. • With teacher guidance is unable to describe or define the correct use of tools, processes, and materials in diverse computer and technology applications. • With direct teacher supervision does not operate technology tools.

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Performance Level Descriptors
Computer and Technology Education Standards

Grade 8

Content Standard 5.0	**Systems:** Students will recognize that systems are made up of individual components and that each component affects the operation of the system and its relationship with other systems
Exceeds Standards	• Create a presentation that illustrates resources necessary to achieve a desired outcome. • Model how one system's output could be input for another system. • Independently selects a system and determine how it is controlled to achieve a desired outcome. • Create / modify a system to produce a desired outcome.
Meets Standards	• List resources necessary to achieve a desired outcome. • Describe how one system's output could be input for another system. • Given the systems in the areas of technology, cooperatively determine how they are controlled to achieve a desired outcome. • Select and use an appropriate system to achieve a given outcome.
Approaches Standards	• Inaccurately lists resources necessary to achieve a desired outcome. • With help can describe how one system's output could be input for another system. • Given a system in the areas of technology, needs a teacher to determine how it is controlled to achieve a desired outcome. • Given a system produces a given outcome.
Below Standard	• Does not recognize resources are necessary to achieve a desired outcome. • Does not understand output and input. • Does not understand the system concept. • Not able to use a given system to produce a given outcome.

Performance Level Descriptors
Technology Education

Grade 8

Content Standard 6.0	Implications on Society. **Students will evaluate the impact and ethical implication on individuals, society and the environment.**
Exceeds Standards	• Explains why legal and ethical behaviors are needed when using technology. • Models how technology and its use impacts society and the environment • Independently research and create a presentation demonstrating how a career has evolved over time. • Independently research a variety of careers and list their educational and/or training requirements.
Meets Standards	• Practices legal and ethical behaviors when using information and technology, and discuss consequences of misuse. • Describe how technology is affecting society and the environment. • Discuss the impact of technology on career options. • Demonstrates that people control technologies and are responsible for their effects.
Approaches Standards	• Occasionally practices legal and ethical behaviors when using technology. • States that people control technologies and are responsible for their effects. • Attempts to and with help can research and create a presentation demonstrating how a career has evolved over time. • Requires help to research a given career and list its educational and/or training requirements.
Below Standard	• Does not practice legal and ethical behaviors when using technology. • Unable to recognize technologies' effects. • Unable to demonstrate how a career has evolved over time. • Even with help has difficulty researching a given career and listing its educational and/or training requirements.

Performance Level Descriptors
Computer and Technology Education Standards

Grade 12

Content Standard 1.0	**Problem Solving:** ***Students will utilize problem-solving processes through the use of resources to reach a desired outcome.***
Exceeds Standards	• Independently analyzes a variety of problem-solving approaches. • Identifies a problem and applies an optimized problem-solving method. • Creates and designs a unique and innovative solution in one of the four areas of technology.
Meets Standards	• Compare and contrast a variety of problem-solving approaches. • When given a problem effectively designs a problem-solving method. • Creates and with technical accuracy designs/models to a problem in one of the four areas of technology.
Approaches Standards	• Has difficulty relating the problem-solving approaches to solutions. • Given a problem has to work collaboratively to develop a problem-solving method. • Relies on traditional designs in solving problems.
Below Standard	• Identifies a single problem-solving approach. • Unable to develop a method. • Unable to solve problems.

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Performance Level Descriptors
Computer and Technology Education Standards

Grade 12

Content Standard 2.0	**Productivity Tools:** Students use appropriate productivity tools including but not limited to word processing, spreadsheet, database, multimedia and telecommunications.
Exceeds Standard	• Type a word processing document that meets the standard and could include tables, columns, bullets and hanging indents. • Utilize appropriate tools that are listed to meet standard. These can include grammar check and readability. • Design and create a database form that utilizes draw features. • Merge a database into another application. • Print reports including headings and subheadings based on sort and query. • Accurately applies spreadsheet formulas to present information. • Consistently determines the significance of the data in a spreadsheet. • Independently applies multi-media strategies combined with transitions to present complex concepts. • Differentiate and evaluate the uses of systems. Explains networking options. • Demonstrates a thorough understanding of electronic communications. • Uses telecommuting and teleconferencing. • Demonstrates a fully developed knowledge of multimedia techniques.
Meets Standard	• Type a correctly formatted multi-page word processing document. Formatting to include, headers, footers, pagination, line spacing and margin settings. • Utilize appropriate tools such as spell check and thesaurus. • Create a database, define fields and enter data for multiple records. • Print reports based on sort and query. • Interpret report based on data. • Develop a spreadsheet including labels, values, formulas and functions. • Create and print a chart to visually represent data from a spreadsheet. • Print a spreadsheet showing the formulas. • Analyze the significance of the data in a spreadsheet. • Create and present a multi-page, multimedia presentations using three of the following, animation, digital video or linking using three of the following: text, graphics and sound. • Identify the intended message of a multimedia presentation. • Organize files on a computer disk, hard drive, server or other storage devices. • Compare and contrast a LAN, WAN, Intranet and the Internet. • Compare and analyze the appropriate uses of a variety of electronic communications. • Locate and evaluate sources of distance learning, telecommuting and teleconferencing.

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Performance Level Descriptors
Computer and Technology Education Standards

Grade 12 (Standard 2.0 continued)

Approaches Standard	• Occasionally applies correct format in conjunction with document preparation. • Displays minimal knowledge of database functions. • Demonstrates a narrow or incomplete understanding of data significance in a spreadsheet. • Demonstrates occasional awareness of multimedia strategies. • Inconsistently analyzes and critiques multimedia presentations. • Demonstrates limited knowledge of LAN, WAN, Intranet and the Internet. • Requires assistance to retrieve information from remote resources. • Experiences difficulty in evaluating sources of distance learning, telecommuting and teleconferencing.
Below Standard	• Rarely applies correct format in conjunction with document preparation. • Shows little or no knowledge of database functions. • Insufficiently demonstrates knowledge of data significance in a spreadsheet. • Little or no success at creating multimedia presentations. • Unable to analyze and critique a multimedia presentation. • Unable to understand the difference between networking systems. • Makes inappropriate selection of distance learning sources.

Performance Level Descriptors
Computer and Technology Education Standards

Grade 12

Content Standard 3.0	**Research Tools:** Students use various technology tools to research information and evaluate its accuracy and appropriateness in order to solve problems and make decisions.
Exceeds Standard	• State clearly a research topic/problem, makes precise list of elements, limits, and expected outcomes. • Independently generates a detailed list of keywords and qualifying modifiers to conduct a comprehensive search with multiple electronic-based sources. • Uses hyperlinks to expand the search while discerning the relevance of the link to the topic/problem. • Organizes research information efficiently and effectively solves the problem. • Differentiates between the various types of information and makes refined selections of most reliable, authentic and timely sources. • Creates a comprehensive bibliography or work cited page. • Evaluate outcome through the use of a given rubric and generates suggestions for improvement.
Meets Standard	• State a research topic/problem, list elements, limits, and expected outcomes. • Independently generates a list of keywords for a research topic/problem with qualifying modifiers to narrow the search of electronic-based sources. • Using a variety of search strategies use hyperlinks to select information. • Select an organizational tool and accurately place collected information within the format to aid in making a decision. • Differentiates between the various types of information and makes selections of reliable, authentic and timely sources. • Creates a standard bibliography or work cited page. • Complete rubric for evaluation of the results and its outcome.
Approaches Standard	• Statement of research topic/problem is vague or too broad. Incomplete or inappropriate list of elements, and limits, but outcome is reasonably stated. • Requires assistance to generate a list of keywords with limited use of qualifying modifiers to conduct a search using electronic-based sources. • Uses hyperlinks to research but relevant material is not consistently selected. • Can place information in an organizational format with some inaccuracies. • Some differentiation between the various types of information with some selection of reliable, authentic and timely sources. • Lists sources with format errors. • Complete rubric with some unrealistic assessments.
Below Standard	• Able to state an outcome but cannot define the research topic/problem clearly or apply the problem solving process to achieve the outcome. • Requires assistance to generate a minimal list of keywords to conduct a search using electronic-based sources. • Uses hyperlinks but connections do not further the research. • Randomly places research information. • Little or no differentiation between the various types of information with poor choices as to reliability, authenticity and timeliness.

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	• Unable to generate a bibliography or work cited page. • Rubric is incomplete or inaccurate.

Performance Level Descriptors
Computer and Technology Education Standards

Grade 12

Content Standard 4.0	**Tools and Processes:** Students will identify, apply concepts, and manage various tools and resources to evaluate their accuracy and appropriateness in solving problems and making decisions.
Exceeds Standards	• Create a presentation summarizing advancements in the areas of technology and explain how new tools, materials and processes are necessary to maintain and improve high productivity and quality. • Use tools independently to produce solutions in a computer or technology area. • Select with technical accuracy the best tool and process. • Independently, can correct non-functioning technology systems.
Meets Standards	• Conduct research in a computer or technology area and explain how new tools, materials and processes are necessary to maintain and improve high productivity and quality. • Use tools, with minimal direction, to produce solutions in a computer or technology area. • Select the correct tool and process. • Under supervision can correct non-functioning technology systems.
Approaches Standards	• Recognizes the need for new tools, but is unable to conduct independent research any area of computer or technology and is unable to explain how new tools, materials and processes are necessary to maintain and improve high productivity and quality. • Create a partial solution in a computer or technology area. • Needs guidance to select the correct tool and process. • Recognizes the problem, but is unable to correct it.
Below Standard	• Fails to recognize the importance of new tools, processes, or materials. • Unable to create a solution. • Inaccurately selects the correct tool and process. • Does not recognize the problem.

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Performance Level Descriptors
Computer and Technology Education Standards

Grade 12

Content Standard 5.0	**Systems:** Students will recognize that systems are made up of individual components and that each component affects the operation of the system and its relationship with other systems.
Exceeds Standards	• Select and predict the future evolution of a system or process. • Design and manage a system and evaluate its efficiency. • Choose a system and identify possible ways to improve; the product, productivity, management, and then implement improvements.
Meets Standards	• Explain the evolution of a given system or process. • Design a model of a system to produce a desired outcome. • Given a system, identify possible ways to improve the product, productivity, and/or management.
Approaches Standards	• Cooperatively explains the evolution of a given system or process. • Requires assistance to design a model of a system to produce a desired outcome. • With assistance and given a system identify possible ways to improve the product, productivity, and/or management.
Below Standard	• Does not explain the evolution of a given system or process. • Fails to properly design a model of a system to produce a desired outcome. • Does not identify ways to improve the product, productivity, and management when given a system.

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Performance Level Descriptors
Computer and Technology Education Standards

Grade 12

Content Standard 6.0	Implications on Society. **Students will evaluate the impact and ethical implication on individuals, society and the environment.**
Exceeds Standards	• Given a product or service predict the impacts on the quality of life. • Forecast future technology advancements and their possible impacts on society and culture. • Develop a career plan and participates in the field of choice. • Clarify the advantages and disadvantages of widespread use of and reliance on technology in the workplace and in society as a whole.
Meets Standards	• Compare and contrast the impacts of new products and services on the quality of life. • Given a technology, determine possible outcomes and their acceptability. • Develop a career plan. • Discuss the advantages and disadvantages of widespread use of and reliance on technology in the workplace and in society as a whole.
Approaches Standards	• States the impacts of a product or service on the quality of life. • With help identifies historical influences on today's society. • Requires help to develop a career plan.
Below Standard	• Unsure of the impacts of a product or service on the quality of life. • Inadequately cites historical influences • Unable to develop a career plan.

Glossary for Computer and Technology Education Standards

Areas of Technology - Energy, power and transportation; communication; construction; manufacturing; and biotechnology.

Closed Loop System - A system that uses feedback to affect the process.

Components - Parts of the computer system, such as keyboard, monitor, or mouse.

Computer Numerical Control (CNC) - Manufacturing process in which numerical directions contained in a computer program control and monitor machines' operations.

Connectivity - The act of communicating between computers, terminals, and networks.

Data Files - The creation of a file with an application, including information you type, edit, view, or save. A document may be a business report, a picture, or a letter and is stored as a file on a disk.

Devices - Things used or constructed for particular purposes such as machines to perform one or more relatively simple tasks. (American Heritage Dictionary)

Electronic Communication - Any method used to convey a message that has been transmitted via electronic means such as e-mail, video conferencing, etc.

Entry-Level Skills - Basic skills required entering a given occupation.

Feedback - The return of information about the result of a process. (American Heritage Dictionary)

File Management - Provides functions to delete, copy, move, rename, view files, and manage directories or folders.

Hyperlinks - A section of text or graphic "links" that when clicked, will take you to another area of a service or Web Page. Most Internet Service Providers support hyperlinks in browsers, Instant Messages and E-Mail. Links are helpful in routing to locations within documents or Internet addresses.

Information Processing Cycle - Data processing; the capturing, storing, updating, and retrieving of data and information.

Input - Something put into a system or expended in its operation to achieve a result or output. (American Heritage Dictionary)

Input Devices - Peripheral devices that enter data into the computer, such as a keyboard, scanner, mouse, or digitizer tablet.

Intranet - An internal (private) network inside a company or organization that works much like the Internet.

Local Area Network (LAN) - A group of computers at a single location that are connected by phone lines, network cables of various configurations. Usually controlled and administered by the system operator, the network administrator.

Model - Simplified version of real objects, events, or systems; often a smaller, simpler version of a real thing.

Multimedia - The use of more than one media, such as any combination of sound, graphics, animation, and video. A multimedia software application contains images, audio, text and, in many cases, video clips and animations.

Open Loop System - A system that does not use information about the output to affect the process.

Operating System Files - Files necessary to run the computer's operating system, such as DOS, Windows, or System 7.

Optimization - The process of seeking the most favorable condition or solution to a goal by balancing the trading-off results on more than one criterion.

Organizational Formats - Outlines, Venn diagrams, web mapping, flow charts or any other schematic used to organize information.

Output - The results, good and bad, of the operation of any system.

Output Devices - Any peripherals that transfer or transmit data from the computer, such as screen, printer, or communications line.

Product - Something produced by human effort or a natural process.

Program Files - An executable file that starts an application or program. A program file has an .EXE, .PIF, .COM, or .BAT filename extension.

Prototype - A working model of a new product, intended to test it operation. (Wright)

Qualifying Modifiers - A word used before an adjective to show the degree of the adjective. i.e. Chemotherapy is the most effective treatment for cancer.)

Resources - The things needed to get a job done. In a technical system the seven types of resources are people, information, materials, tools and machines, energy, capital, and time.

System - A group of interacting, interrelated, or interdependent elements forming a complex whole. (American Heritage Dictionary) Types of systems include: open loop, closed loop, simple, complex, micro, macro, energy, power and transportation; communication; construction; manufacturing; and biotechnology.

Technology - Human innovation in action. It involves the generation of knowledge and processes to develop systems that solve problems and extend human capabilities. (ITEA) The use of accumulated knowledge to process resources to satisfy human needs and wants. (Hacker)

Telecommuting - A term used to indicate the process of working outside of the office by a modem hookup to the main office system.

Teleconferencing - Voice or video over a telephone line in which more than two people are simultaneously connected.

Trade-offs - An exchange of one thing in return for another to achieve a desired result.

Venn diagrams - A pictoral representation using circles and squares so positioned as to represent an operation in set theory. A graph that employs circles to represent logical relations by the inclusion, exclusion, or intersection of the circles.

Wide Area Network (WAN) - A private long distance network that uses leased lines to connect computers or LANs. A wide area network is a linking of computers not physically attached through conventional network connectivity. Usually the WAN connection is a dedicated or high-grade dial up phone link. It is often done with T1 or T3 connections but can also be through satellite or other technologies.

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